IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	**Vincent LOSCHIAVO**
App. No.	:	**10/533,167**
Filed	:	**April 29, 2005**
For	:	**Combustion Engine**
Examiner	:	**Kamen, Noah P.**
Group Art Unit	:	**3747**

RESPONSE TO NON-FINAL REJECTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice of Non-Final Rejection mailed July 7, 2006, Applicant respectfully requests the Examiner to enter the amendments to the Specification and Claims, and consider the following arguments for allowability.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims, which begin on page 3 of this paper.

Remarks/Arguments begin on page 9 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please amend the Specification as shown below. Deletions are ~~strikethrough~~ and additions are underlined.

Paragraph

[0026] ~~FIG. 1~~ The figure shows a cross section of a combustion engine constructed in accordance with the invention.

Paragraph

[0077] Referring to ~~FIG. 1~~ the figure, the combustion engine described therein comprises two assemblies of pistons within two opposed cylinder elements. As both of these assemblies are mirror images of each other, reference to one component for one of the assemblies should be interpreted as implying an equivalent component in the other of the assemblies as well.

Paragraph

[0099] A typical operating cycle of the engine described with reference to ~~FIG. 1~~ the figure will now be described.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the Application. Deletions are ~~strikethrough~~ and additions are underlined.

Listing of Claims:

1. (Currently amended) A combustion engine comprising, a pair of opposed cylinder elements having a common axis, each cylinder element being provided with a piston reciprocable between first and second locations in the cylinder element the first and second locations respectively representing compression and expansion elements of the piston stroke, each piston having a forward side and a rear side, a combustion chamber for each cylinder element comprising the forward side of the piston and the walls of the cylinder element, combustible gas compression means for each combustion chamber, supply passage means arranged to deliver combustible gas to each combustion gas compression means, an induction chamber for each piston arranged to receive compressed combustible gas from the combustible gas compression means, transfer passage means for directing compressed gas from each induction chamber to the respective combustion chamber, ~~and~~ cam means rotatable about the common axis the cam means being located between the pistons and being connected to each of the pistons for converting the reciprocating motion of the pistons into rotary motion of the cam means, the cam means comprising a cam track encircling a drive shaft aligned with the common axis, and cam follower means connected to the pistons the cam follower means being arranged to follow the cam track whereby to convert the reciprocating motion of the pistons into rotary motion of the drive shaft, wherein the arrangement is such that expansion stroke movement of each piston results in a corresponding compression stroke for the compression means and the pistons are coupled so that an expansion stroke of one of the pistons drives the compression stroke of the other of the pistons.

2. (Canceled)

3. (Currently amended) ~~A~~ The combustion engine according to claim ~~2~~ 1 wherein the cam track comprises a groove formed in the drive shaft.

4. (Currently amended) ~~A~~ The combustion engine according to claim 1 comprising a bore assembly extending through each piston and in line with the axis of each piston and the transfer passage means extend within the bore, the transfer passage means including a transfer port for each piston arranged to communicate with the combustion chamber comprising the forward side of each piston, when each piston is at or near the second location.

5. (Currently amended) ~~A~~ The combustion engine according to claim 4 including valve means operable by rotation of the cam means to close the transfer port during exhaustion of combusted gases from the combustion chamber and to open the transfer port after exhaustion of combusted gases from the combustion chamber.

6. (Currently amended) ~~A~~ The combustion engine according to claim 1 comprising an exhaust passage communicating with the combustion chamber when the piston is at or near the second location, the piston being arranged to close off the exhaust passage when it moves to the first location.

7. (Currently amended) ~~A~~ The combustion engine according to claim 1 comprising, an intermediate assembly extending between the pistons and connecting the rear side of each piston the intermediate assembly being slidable reciprocably along a ~~centre~~ center housing surrounding the cam means, and the combustible gas compression means comprise, a first induction/compression chamber for each piston between an end of the intermediate assembly and a piston sealing member, and a second induction/compression chamber for each piston between the forward side of the piston and the piston sealing member.

8. (Currently amended) ~~A~~ The combustion engine according to claim 7 comprising, intermediate ducting means for allowing communication between the first induction/compression chamber of one piston and the induction/compression chamber of the other piston.

9. (Currently amended) ~~A~~ The combustion engine according to claim 1 wherein the supply passage means comprise, a supply duct communicating with each induction/compression chamber, and valve means for allowing combustible gas to be sucked through the supply duct into the respective induction/compression chamber during an expansion stroke of the piston arranged to receive combustible gas from that induction/compression chamber.

10. (Currently amended) ~~A~~ The combustion engine according to claim 4 wherein the drive shaft extends into both bore assemblies and through a head for at least one of the combustion chambers.

11. (Currently amended) ~~A~~ The combustion engine according to claim 10 comprising a head for each combustion compression chamber, the drive shaft extending through each head.

12. (Currently amended) ~~A~~ The combustion engine according to claim 7 wherein the combined volume of each pair of the first and second induction compression chambers is greater than the volume of each of the combustion chambers.

13. (Currently amended) ~~A~~ The combustion chamber according to claim 12 wherein the combined volume is at least 1.2 times the volume of each of the combustion chambers.

14. (New) A combustion engine comprising, a pair of opposed cylinder elements having a common axis, each cylinder element being provided with a piston reciprocable between first and second locations in the cylinder element the first and second locations respectively representing compression and expansion elements of the piston stroke, each piston having a forward side and a rear side, a combustion chamber for each cylinder element comprising the forward side of the piston and the walls of the cylinder element, combustible gas compression means for each combustion chamber, supply passage means arranged to deliver combustible gas to each combustion gas compression means, an induction chamber for each piston arranged to receive compressed combustible gas from the combustible gas compression means, a bore assembly extending through each piston and in line with the axis of each piston transfer passage means for

directing compressed gas from each induction chamber to the respective combustion chamber, the transfer passage means extending within the bore, the transfer passage means including a transfer port for each piston arranged to communicate with the combustion chamber comprising the forward side of each piston, when each piston is at or near the second location, and cam means rotatable about the common axis the cam means being located between the pistons and being connected to each of the pistons for converting the reciprocating motion of the pistons into rotary motion of the cam means, wherein the arrangement is such that expansion stroke movement of each piston results in a corresponding compression stroke for the compression means and the pistons are coupled so that an expansion stroke of one of the pistons drives the compression stroke of the other of the pistons.

15. (New) The combustion engine according to claim 14 including valve means operable by rotation of the cam means to close the transfer port during exhaustion of combusted gases from the combustion chamber and to open the transfer port after exhaustion of combusted gases from the combustion chamber.

16. (New) The combustion engine according to claim 14 comprising an exhaust passage communicating with the combustion chamber when the piston is at or near the second location, the piston being arranged to close off the exhaust passage when it moves to the first location.

17. (New) The combustion engine according to claim 14 comprising, an intermediate assembly extending between the pistons and connecting the rear side of each piston the intermediate assembly being slidable reciprocably along a center housing surround the cam means, and the combustible gas compression means comprise, a first induction/compression chamber for each piston between an end of the intermediate assembly and a piston sealing member, and a second induction/compression chamber for each piston between the forward side of the piston and the piston sealing member.

18. (New) The combustion engine according to claim 17 comprising, intermediate ducting means for allowing communication between the first induction/compression chamber of one piston and the induction/compression chamber of the other piston.

19. (New) The combustion engine according to claim 14 wherein the supply passage means comprise, a supply duct communicating with each induction/compression chamber, and valve means for allowing combustible gas to be sucked through the supply duct into the respective induction/compression chamber during an expansion stroke of the piston arranged to receive combustible gas from that induction/compression chamber.

20. (New) The combustion engine according to claim 14 comprising a head for each combustion compression chamber, the drive shaft extending through each head and into both bore assemblies.

21. (New) A combustion engine comprising, a pair of opposed cylinder elements having a common axis, each cylinder element being provided with a piston reciprocable between first and second locations in the cylinder element the first and second locations respectively representing compression and expansion elements of the piston stroke, each piston having a forward side and a rear side, a combustion chamber for each cylinder element comprising the forward side of the piston and the walls of the cylinder element, combustible gas compression means for each combustion chamber, the combustible gas compression means comprising a first induction/compression chamber for each piston between an end of the intermediate assembly and a piston sealing member, and a second induction/compression chamber for each piston between forward side of the piston and the piston sealing member, supply passage means arranged to deliver combustible gas to each combustion gas compression means, an induction chamber for each piston arranged to receive compressed combustible gas from the combustible gas compression means, transfer passage means for directing compressed gas from each induction 15 chamber to the respective combustion chamber, cam means rotatable about the common axis the cam means being located between the pistons and being connected to each of the pistons for converting the reciprocating motion of the pistons into rotary motion of the cam means, and an

intermediate assembly extending between the pistons and connecting the rear side of each piston, the intermediate assembly being slidable reciprocably along a center housing surrounding the cam means, wherein the arrangement is such that expansion stroke movement of each piston results in a corresponding compression stroke for the compression means and the pistons are coupled so that an expansion stroke of one of the pistons drives the compression stroke of the other of the pistons.

22. (New) The combustion engine according to claim 21 comprising, intermediate ducting means for allowing communication between the first induction/compression chamber of one piston and the induction/compression chamber of the other piston.

23. (New) The combustion engine according to claim 21 wherein the supply passage means comprise, a supply duct communicating with each induction/compression chamber, and valve means for allowing a combustible gas to be sucked through the supply duct into the respective induction/compression chamber during an expansion stroke of the piston arranged to receive combustible gas from that induction/compression chamber.

REMARKS

Claims 1 - 23 are pending. Claims 1 and 3 - 13 are Currently amended. Claim 2 is Canceled. Claims 14 - 23 are New.

Drawings

References to the drawing have been changed from "FIG. 1" to "the figure" as suggested by the Examiner.

35 U.S.C. § 102 Rejection

The Examiner has rejected Claims 1, 6, and 9 under 35 U.S.C. § 102 as being anticipated by Arney (3757748). Additionally, Claims 2-5, 7, 8, 10-13 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in Independent form including all the limitations of the base claim.

Applicant has amended Independent Claim 1 to include all the limitations of dependent Claim 2 and canceled Claim 2. Claims 3 – 13 are dependent from Claim 1.

The amendments to Claims 1 and 3-13 remove Arney as Prior Art. Applicant believes Claims 1 and 3-13 are allowable and respectfully asks the Examiner to allow these claims.

New Claims 14 – 20

Independent Claim 14 combines the limitations of Original Claim 1 and Original Claim 4. Claim 14 and its dependent Claims 15-20 contain limitations that remove Arney as Prior Art. Applicant believes Claims 14-20 are allowable and respectfully asks the Examiner to allow these claims.

New Claims 21 - 23

Independent Claim 21 combines the limitations of Original Claim 1 and Original Claim 7. Claim 21 and its dependent Claims 22 and 23 contain limitations that remove Arney as Prior Art. Applicant believes Claims 14-20 are allowable and respectfully asks the Examiner to allow these claims.

CONCLUSION

The claims have been amended to claim more precisely the disclosed invention. No new matter has been added by the amendments to the claims.

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims, the reasons therefore, and arguments in support of the patentability of the pending claim set are presented above. In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested and it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

This Response to a Non-Final Rejection is filed within 3 months of the mailing of the Office Action and no extension fees are believed due. Payment is made for 2 extra dependent claims. The Commissioner is authorized to charge any additional fees, including any fees for additional extension of time, or credit overpayment to credit card information on record.

Date: September 29, 2006

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